

REMARKS

Claims 1, 17, and 20 have been amended. Accordingly, claims 1-20 are currently pending in the application, of which claims 1, 17, and 20 are independent claims.

Applicant respectfully submits that the above amendments do not add new matter to the application and are fully supported by the specification. Support for the amendments may be found at least in paragraphs [0022], [0035], and [0037] of the specification.

In view of the above amendments and the following Remarks, Applicant respectfully requests reconsideration and timely withdrawal of the pending objections and rejections for the reasons discussed below.

Rejections Under 35 U.S.C. § 112, first paragraph

Claims 2, 5, 8, 13, and 14 stand rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the enablement requirement. Applicants respectfully traverse this rejection for at least the following reasons.

The Advisory Action states that “Applicant lists how volume and concentration are correlated, but not how pressure is correlated with the two” (continuation page). However, pressure is not recited in any of the claims and cannot be used as the basis for this rejection. As stated in the Office Action, the enablement requirement is regarding the relationship between the sensor volume change and the fuel concentration (page 3, paragraph 4).

As noted in Applicant’s Reply of March 15, 2007, the specification describes the location and function of the sensor (paragraphs [0023]-[0025] and [0028]), the structure and operation of the two embodiments of the sensor (paragraphs [0029]-[0030], [0036]-[0037], and Figs. 3-4), and the material of the sensor’s pressure film or pressure member (paragraphs [0030] and [0036]). Furthermore, paragraphs [0032] and [0039] and Figs. 5-6 show the substantially linear relationship between the sensor’s volume change and fuel concentration in a certain

concentration range and show that the sensor's volume does not change over time. Thus, the disclosure describes the sensor and the relationship between the sensor volume change and the fuel concentration in a way that enables one of ordinary skill in the art to make and use the invention without undue experimentation.

Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 112, first paragraph rejection of claims 2, 5, 8, 13, and 14.

Rejections Under 35 U.S.C. § 102

Claim 1 stands rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by U.S. Patent No. 6,303,244 issued to Surampudi, *et al.* ("Surampudi").

In order for a rejection under 35 U.S.C. § 102(b) to be proper, a single reference must disclose every claimed feature. To be patentable, a claim need only recite a single novel feature that is not disclosed in the cited reference. Thus, the failure of a cited reference to disclose one or more claimed features renders the 35 U.S.C. § 102(b) rejection improper.

Claim 1, as amended, recites, *inter alia*:

a fuel storage unit that stores the fuel to be supplied to the fuel cell stack;
a diluent storage unit that stores only a diluent that is a byproduct of the chemical reaction in the fuel cell stack...
...wherein the diluent is H₂O

Surampudi fails to disclose at least these features. Rather, Surampudi discloses condensers 940 and 942 that lower the water temperature and allow both methanol and the water from the electrode stack 924 to condense (col. 18, lines 31-35). Because both methanol and water pass through the condensers 940 and 942, the condensers 940 and 942 do not store "only a diluent that is a byproduct of the chemical reaction in the fuel cell stack...wherein the diluent is H₂O" (emphasis added). Therefore, Surampudi fails to teach or suggest each and every feature of claim 1.

Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 102(b) rejection of claim 1. Claims 2-16 depend from claim 1 and are allowable at least for this reason. Since none of the other prior art of record discloses or suggests all the features of the claimed invention, Applicants respectfully submit that independent claim 1, and all the claims that depend therefrom, are allowable.

Rejections Under 35 U.S.C. § 103

Claim 2 stands rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Surampudi as applied to claim 1 above in view of U. S. Patent No. 6,890,674 issued to Beckmann, *et al.* ("Beckmann").

Applicants respectfully submit that claim 1 is allowable over Surampudi and Beckmann fails to cure the deficiencies of Surampudi noted above with regard to claim 1. Hence, claim 2 is allowable at least because it depends from an allowable claim 1.

Claims 3-4 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Surampudi as applied to claim 1 above in view of U. S. Patent No. 6,686,081 issued to Gottesfeld ("Gottesfeld").

Applicants respectfully submit that claim 1 is allowable over Surampudi and Gottesfeld fails to cure the deficiencies of Surampudi noted above with regard to claim 1. Hence, claims 3-4 are allowable at least because they depend from an allowable claim 1.

Claims 5-8 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Surampudi in view of Gottesfeld as applied to claims 1, 3, and 4 above, and further in view of Beckmann.

Applicants respectfully submit that claim 1 is allowable over Surampudi and Gottesfeld and Beckmann fail to cure the deficiencies of Surampudi noted above with regard to claim 1. Hence, claims 5-8 are allowable at least because they depend from an allowable claim 1.

Claims 9-16 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Surampudi as applied to claim 1 above and in view of U.S. Patent No. 6, 306, 285 issued to Narayanan et al. (“Narayanan”), Beckmann, and U.S. Patent No. 5,033, 293 issued to Honma et al. (“Honma”).

Applicants respectfully submit that claim 1 is allowable over Surampudi and Narayanan, Beckmann, and Honma fail to cure the deficiencies of Surampudi noted above with regard to claim 1. Hence, claims 9-16 are allowable at least because they depend from an allowable claim 1.

Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 103(a) rejection of claims 2-16. Since none of the other prior art of record, whether taken alone or in any combination, discloses or suggests all the features of the claimed invention, Applicants respectfully submit that claims 2-16 are allowable.

Claims 17, 18, and 19 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Narayanan in view of Beckmann and U.S. Patent Application Publication No. 2001-0037000 issued to Goto, et al. (“Goto”). Claim 20 stands rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Narayanan in view of Beckmann.

To establish an obviousness rejection under 35 U.S.C. § 103(a), four factual inquiries must be examined. The four factual inquiries include (a) determining the scope and contents of

the prior art; (b) ascertaining the differences between the prior art and the claims in issue; (c) resolving the level of ordinary skill in the pertinent art; and (d) evaluating evidence of secondary consideration. *Graham v. John Deere*, 383 U.S. 1, 17-18 (1966). In view of these four factors, the analysis supporting a rejection under 35 U.S.C. 103(a) should be made explicit, and should "identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements" in the manner claimed. *KSR Int'l. Co. v. Teleflex, Inc.*, 550 U.S. ___, slip op. at 14-15 (2007). Furthermore, even if the prior art may be combined, the combination must disclose or suggest all of the claim limitations. See *in re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claims 17 and 20, as amended, both recite, *inter alia*:

wherein the sensor film changes volume thereof depending on a concentration of fuel in fuel mixture, and
wherein a signal is output when an expansion coefficient of the sensor is not within a reference range

Narayanan, Beckmann, and Goto fail to disclose at least these features of claims 17 and 20. Narayanan discloses a sensor element 200 made by mounting a membrane electrode assembly 210 between two current collection plates 220, 230 (Figure 2, column 4, lines 7-9). The membrane 250 may include NAFION™ that is pretreated in a swelling agent (column 4, lines 29-31). Since the NAFION™ is pretreated in a swelling agent, it may be inferred that the NAFION™ does not swell when the sensor is operated. Additionally, Narayanan discloses methanol concentration can be determined using the sensor element 200 because after a threshold high anode potential, the mass transport of methanol to the surface of the anode becomes the current-limiting mechanism, which allows higher concentration of methanol to sustain higher current densities (column 4, line 65 - column 5, line 8). As such, the sensor of Narayanan functions in an entirely different manner than that of the claimed function. The sensor element 200 of Narayanan does not include a sensor film that changes in volume

depending on a concentration of fuel in fuel mixture and no signal is output when an expansion coefficient of the sensor is not within a reference range.

Beckman discloses that NAFION™ can be used as sensor because it expands with methanol concentration. In the Advisory Action, the Examiner clarified that Beckman was being relied on to show that since the sensors of Narayanan and Beckman both include NAFION™, "Both sensors are made of the same material (even if prepared in slightly different manners) would thus inherently function in a similar manner." However, the sensors of Beckman and Narayanan do not include the same material. The NAFION™ employed by Narayanan is pre-treated in a swelling agent such as isopropanol" (col. 4, lines 29-31). Beckmann, however, discloses no such treatment of the NAFION™ expansion material.

The Examiner has failed to provide any basis for her assertion that NAFION™ that has been pre-treated in a swelling agent such as isopropanol functions the same way as NAFION™ that has not been pre-treated in a swelling agent. "To establish inherency, the extrinsic evidence, 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill in the art.' *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d, 1949, 1950-51 (Fed. Cir. 1999) (citations omitted). "In relying upon the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original).). "The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic." MPEP § 2112.IV (citing to *In re Rijckaert*, 9 F.3d 1531, 1534, (Fed. Cir. 1993)).

Therefore, Applicants respectfully submit that the Examiner has failed to show that the material of Narayanan and Beckmann function in the same way. Goto is relied on to teach the

use of sulfonated polyolefins in batteries, fuel cells, and sensors and thus, fails to cure the deficiencies in Narayanan and Beckmann.

Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 103(a) rejection of claims 17 and 20. Claims 18-19 depend from claim 17 and are allowable at least for this reason. Since none of the other prior art of record, whether taken alone or in any combination, discloses or suggests all the features of the claimed invention, Applicants respectfully submit that independent claims 17 and 20, and all the claims that depend therefrom, are allowable.

CONCLUSION

Applicants believe that a full and complete response has been made to the pending Office Action and respectfully submit that all of the stated grounds for rejection have been overcome or rendered moot. Accordingly, Applicants respectfully submit that all pending claims are allowable and that the application is in condition for allowance.

Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact Applicants' undersigned representative at the number below to expedite prosecution.

Prompt and favorable consideration of this Reply is respectfully requested.

Respectfully submitted,

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